

**SEDIMENT URINE DESCRIPTION IN THE SUFFER**  
**Urinary tract infection (UTI)**  
**IN RSUD PROF. DR. ALOEI SABOE**

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**ABSTRACT**

Urinary Tract Infection (UTI) is an inflammatory response of the urothelial cells lining the urinary tract due to bacterial invasion and is characterized by bacteria, uria and leukositoria. Urinary tract infections that occur in women and men. The aim of the previous study was to determine the description of the results of erythrocyte examination in the urine sediment of patients with urinary tract infections. Macroscopic Urine What is examined is the volume, color, clarity, specific gravity, odor and pH of urine. Measurement of urine volume is useful for interpreting the results of a quantitative or semi-quantitative examination of a substance in urine and for determining abnormalities in the balance of body fluids. The background of the above problems encourages researchers to find out more about the description of Urine Sediment in Patients with Urinary Tract Infection (UTI) at Prof. Dr. AloeI Saboe.

Based on the results of the above study, 15 patients with Urinary Tract Infection (UTI) had morning urine samples taken and urine sediment examinations were carried out in the hospital laboratory. Prof. Dr. H. AloeI Saboe.

The results of the urine sediment examination were abnormal or there was an increase in the number of erythrocytes and leukocytes in the urine sediment of the 15 patients. From the results of this study it can be concluded that in patients with urinary tract infections (UTIs) it was found that ertrocytes were more dominated. from 0-2/lpb (93%) and leucocytes more than 0-5/lpb (80%) or abnormal.

**Keywords:** urinary tract infection (UTI), urine sediment

**INTRODUCTION**

Urinary Tract Infection (UTI) is an inflammatory response of urothelial cells lining the urinary tract due to bacterial invasion and is characterized by bacteriuria and leukocytia. Urinary Tract Infection is an infection that is often found in health care settings, both outpatients and inpatients. Most UTIs are caused by gram-negative bacteria, especially *Escherichia coli*, *Pseudomonas* species and organisms belonging to the *Enterobacter* group. Urinary Tract Infection (UTI) is a disease

that can affect anyone.

There are 8.3 million cases reported annually worldwide. Urinary tract infection is the most common infectious disease in health services worldwide. Most urinary tract infections are caused by catheter insertion. About 40% of infections in hospital are Urinary Tract Infections (UTIs) whereas 80% of UTIs are due to catheter insertion [18]. Approximately 12%-16% of adult patients with a urinary catheter inserted remain in the hospital and 3%-7% of patients develop urinary tract

infections due to catheter insertion [7].

Urinary tract infection is the second most common disease in Indonesia after upper respiratory tract infection which occurs in the population with an average of 9.3% in women and 2.5-11% in men in the age group over 65 years, the risk of urinary tract infections increases by about 5 years. % every day on the use of a urine catheter. There are 17% incidence of nosocomial bacteremia caused by urinary tract infection and causing death in about 10%. [10].

Patients with Urinary Tract Infection in RSUD. Prof. Dr. Hi Aloe Saboe, Gorontalo city in 2019 from January to December there were 54 cases of urinary tract infection. Urinary tract infections that occur in both women and men are hypertrophy of the prostate and its consequences. Proteinuria, hematuria, and impaired excretory function are often asymptomatic if mild, and are found on routine examinations (eg in insurance medical examinations) [16].

The process of urinary tract infection is caused by the *Escherichia coli* (*E.coli*) bacteria found in the intestine, although this disease can also be caused by other types of bacteria. When *Echerchia.coli* is found on the skin or near the anus, these bacteria can enter the urethra and move to other places. In women, the risk of this infection is higher. Because the urethra and anus are located close together. Bacteria are also able to enter the urethra through catheters used in medical therapy. In addition, sexual intercourse can also cause cystitis. People can become infected even if they are not sexually active. Urinary tract infections can also be caused by infection from other areas to the kidneys. Urinary tract infections are generally not contagious, but having sex when infected can cause pain [3]. Diagnosing urinary tract infections is not only based on the clinical symptoms and signs of the infection, but it is necessary to

have investigations to prove the presence of microorganisms in the urinary tract [1]. Urine examination is one of the most important tests to diagnose urinary tract infections. This examination includes urinalysis and urine culture examination. [14]. In the case of urinary tract infections, bacteria that cause UTI enter through the blood vessels which then cause bacteremia [14]. Diagnosing urinary tract infections is not only based on clinical symptoms and signs of infection, but it is necessary to have investigations to prove the presence of microorganisms in the urinary tract [1]. Urine examination is one of the most important tests to diagnose urinary tract infections. This examination includes urinalysis and urine culture examination [14].

The pattern of germs that cause UTIs will play an important role in the success of UTI treatment. The variety of causes of UTI, the wide spectrum of organisms that cause it, and the limited number of clinical trials that have been carried out, complicate the preparation of antimicrobial options that can be used in UTI therapy [12]. Patients with urinary tract infections usually experience frequent urge to urinate, even though the urine comes out a little; Pain or pressure in the back or lower abdomen Bloody or darker urine feels tired or trembling. *Escherichia Coli* bacteria aka *E. Coli*. is the most common cause of urinary tract infections. To prevent UTIs due to this bacterial infection, make sure to always maintain cleanliness in the female area and reduce the use of panty liners.

Urinary tract infections can also occur due to lack of cleanliness when cleaning the intimate area. Therefore, it is advisable to always clean the intimate organs in the right way, that is, from front to back, not the other way around. Cleaning the intimate organs should also be done using clean running water.

Urinalysis is an analysis method to

obtain materials or substances that may be contained in urine and also to see for abnormalities in the urine. Urine tests include routine urine tests, complete urine tests, Bence Jones protein, and creatinine clearance. However, tests that are often done are routine urine examinations and complete urine examinations [4]

“Fresh” (freshly excreted) urine is normally slightly acidic, with a pH of around 6.0. Urine pH in certain diseases can increase or decrease. Acidic urine (pH 4.5-5.5) can occur in diabetes, and alkaline urine (pH 7.8-8.0) usually occurs in patients with Urinary Tract Infection (UTI).

There are three normal urine formation processes to remove metabolic wastes, namely plasma glomerulus filtration, tubular reabsorption and tubular secretions. The glomerulus filtration consists of three layers of cells. The first layer is the capillary endothelium which is commonly called the fenestra lamina because there are pores with a diameter of 50-100 nm. The second layer is the basement membrane which consists of woven fine fibrils embedded in a gel-like matrix and the third layer is the podocyte which is the visceral layer of the Bowman's capsule. Blood cells and large molecules such as large proteins and negatively charged proteins such as albumin are restrained by size selection and charge selection which are the hallmarks of the glomerular filtration membrane barrier. Meanwhile, molecules that are smaller or with a neutral or positive load, such as water and crystalloids, are filtered out. The next process is tubular reabsorption and secretion. There are three classes of substances that are filtered in the glomerulus, namely electrolytes, non-electrolytes and water. Some of the most important electrolytes are sodium (Na<sup>+</sup>), potassium (K<sup>+</sup>), calcium (Ca<sup>++</sup>), magnesium (Mg<sup>++</sup>), bicarbonate (HCO<sub>3</sub><sup>-</sup>), chloride (Cl<sup>-</sup>) and phosphate (HPO<sub>4</sub><sup>-</sup>).

Meanwhile, the important non-electrolytes are glucose, amino acids and metabolites which are the end products of protein metabolism processes such as urea, uric acid and creatinine. Some of the most important electrolytes are sodium (Na<sup>+</sup>), potassium (K<sup>+</sup>), calcium (Ca<sup>++</sup>), magnesium (Mg<sup>++</sup>), bicarbonate (HCO<sub>3</sub><sup>-</sup>), chloride (Cl<sup>-</sup>) and phosphate (HPO<sub>4</sub><sup>-</sup>). Meanwhile, the important non-electrolytes are glucose, amino acids and metabolites which are the end products of protein metabolism processes such as urea, uric acid and creatinine. Some of the most important electrolytes are sodium (Na<sup>+</sup>), potassium (K<sup>+</sup>), calcium (Ca<sup>++</sup>), magnesium (Mg<sup>++</sup>), bicarbonate (HCO<sub>3</sub><sup>-</sup>), chloride (Cl<sup>-</sup>) and phosphate (HPO<sub>4</sub><sup>-</sup>). Meanwhile, the important non-electrolytes are glucose, amino acids and metabolites which are the end products of protein metabolism processes such as urea, uric acid and creatinine.

Types of urine specimens

- Morning urine specimen, the morning urine sample has the most concentrated concentration.
- Instantaneous urine specimens, a random urine sample, which can be collected at any time, can be used for screening for substances that are indicators of kidney infection,
- 24-hour urine specimen, the 24-hour urine specimen is stored in a clear bottle with a capacity of 2 liters and with a stopper. On the first day, after waking up in the morning, the patient will usually urinate; This urine (the first urine) is not taken as a sample. Urine that is excreted during the next voiding time of the patient, throughout the day, is collected in a bottle. The first urine on the next day is sampled and stored in a bottle. The bottle containing this urine sample must be sent to the laboratory immediately. Measure the volume of the urine sample using a measuring cup and record the results.

- d. Midstream urine specimen, the patient collects approximately 20 ml of urine, into an open container, while urinating; this container should be closed immediately afterward.
- e. Terminal urine specimen, the patient collects the last portion of urine that he passes into an open container. N Urine specimens are taken with a catheter,
- f. The collection of urine specimens by catheter should be carried out by a doctor or a trained nurse. Specimens taken by this procedure are usually used for certain bacteriological tests, especially in female patients. However, specimens taken by normal (non-invasive) procedures, after the genital area have been thoroughly cleaned, can usually be used also for this purpose [6]

Urine examination is an examination of patients who are suspected of having kidney problems or urinary tract infections. In addition, many patients have no clinical symptoms at all, in such cases, a urinary tract infection, which was previously undetected, can be diagnosed by urine examination [6].

The urine specimen container must be clean, dry, and wide mouth. If the urine specimen has to be sent to another place, regardless of length, a suitable preservative must be added to the specimen, to prevent the growth of bacteria or the hatching of viable eggs [6].

Urine sediment examination which includes routine examinations. The urine used is fresh urine, or urine with a preservative preferably formalin. The best for sediment testing is concentrated urine, which is urine that has a specific gravity of 1023 or higher, concentrated urine is easier to find in the morning urine for testing. Microscopic examination of sedimentary elements is divided into two groups, namely organic and non-organic. This is carried out according to indications, for example on organic substances: blood cells, epithelial cells, oval fat bodies. And

non-organic: crystals, bacteria, fat [8].

First of all, observe the entire field of view objectively 10x and the capacitor is lowered. Next, observe the entire field of view in more detail with a 40x objective and the condenser is lowered (or the diaphragm is shrunk). Report the number of each element found per small field of view [6].

For routine chemical checks on urine, you can use a dipstick. Many types of screening are carried out using dipstick (dipand-read test strip, reagent strip). Examination using dip strips is usually very quick, easy and specifies a dipstick in the form of a stiff plastic strip which is attached to the side with one to nine swabs of paper or other absorbent material, each of which contains specific reagents for one of the substances that may be present in the urine. The presence and amount of the substance sought are indicated by a specific discoloration of the part containing the specific reagent, the color scale accompanying the dipstick allows a semi-quantitative assessment [8]

This test provides an overview of the presence of urinary tract infections, kidney or urinary tract stones, nephritis, malignancy or liver disease. There is no specific type of urine cast that is pathognomonic for specific renal disease disorders, although there are blood cell casts of white blood cells. Urine sediment may be normal in pre-renal or post-renal conditions with minimal or no proteinuria. [18].

Urinary sediment is the insoluble elements in urine that come from the blood, kidneys and urinary tract such as erythrocytes, leukocytes, epithelial cells, thoracic, bacteria, crystals, fungi and parasites. Urine sediment tests or microscopic tests are used to identify the elements of sediment so that they are used to detect kidney and urinary tract disorders. In addition, urine sediment tests can also be used to monitor the progression

of kidney and urinary tract diseases after treatment.

The urine sediment test can use the Shih-Yung method, which is a method of determining urine sediment that shows better accuracy and precision compared to semi-quantitative methods, reducing disease transmission due to the use of centrifuge tubes, disposable counting rooms. In addition, the Shih-Yung method provides quantitative reporting. In the urine sediment test, the volume of urine sample required according to the standard is 12 ml, after centrifuge automatically remains  $\pm 0.6$  ml of urine sediment [11].

Urine mainly consists of water, urea and sodium chloride [12]. Urea is the end product of protein metabolism and is derived from amino acids in the liver to the kidneys. The average amount of normal urine is 1-2 liters a day, but the amount that is excreted is different each time according to the amount of fluid intake. Normal urine color is clear pale orange without sediment, has a strong odor, has a slightly acidic reaction with an average pH of 6, and the BJT ranges from 1010 to 1025.

The specific gravity of urine depends on the amount of substances dissolved or carried in the urine. If the kidneys dilute the urine (for example, as easy as drinking water), the specific gravity (BJ) is less than 1,010. concentration. When the kidneys concentrate urine, the specific gravity (BJ) is more than 1,010. The concentration of the kidneys was measured according to the highest specific gravity [12].

There are three normal urine formation processes to remove metabolic wastes, namely plasma glomerulus filtration, tubular reabsorption and tubular secretions. The glomerulus filtration consists of three layers of cells. The first layer is the capillary endothelium which is commonly called the fenestra lamina because there are pores with a diameter of 50-100 nm. The second layer is the basement membrane which consists of

woven fine fibrils embedded in a gel-like matrix and the third layer is the podocyte which is the visceral layer of the Bowman's capsule. Blood cells and large molecules such as large proteins and negatively charged proteins such as albumin are restrained by size selection and charge selection which are the hallmarks of the glomerular filtration membrane barrier. Meanwhile, molecules that are smaller or with a neutral or positive load, such as water and crystalloids, are filtered out. Urine examination is an examination of patients who are suspected of having kidney problems or urinary tract infections.

Based on research conducted by [2], it was found that the results of erythrocyte examination in the urine sediment of patients with isk were found to be more 0-2/lpb or abnormal.

From the description above, it encourages researchers to find out more about the description of urine sediment in RSUD prof. dr. Aloei Saboe.

## RESEARCH METHODS

This type of research is a quantitative approach and by means of sample examination, namely patients who submit requests for urine sediment tests in the laboratory and are diagnosed by doctors as UTI sufferers. The research was conducted at the Clinical Laboratory of Prof. Dr. Aloei Saboe. Gorontalo City during October to December 2020.

The population in this study were all urinary tract infection patients who were treated at Prof. Dr. H. Aloei Saboe. The samples in this study were 15 patients with urinary tract infections in the morning using purposive sampling technique. The variables observed in this study were macroscopic images (volume, odor, color, pH) and microscopic images. (Leukocytes, Erythrocytes) urine sediment.

The operational definition in this research is urinary tract infection is an

infection that is often found in health care facilities caused by microorganisms and urine sediment is an insoluble element in urine that comes from the blood, kidneys and urinary tract.

Subjects used in this study were based on criteria, namely inclusion criteria, namely patients who submitted requests for urine sediment tests at the Laboratory of Prof. Dr. Aloe Saboe Adult age  $\geq 20$  years and exclusion criteria, namely Patients with difficulty passing urine less than the specified urine volume, Patients who are experiencing menstruation and Patients who are taking drugs that can disrupt the color of urine such as rifampis.

Analysis of the data used in this study was the analysis technique with univariate analysis, namely describing the data that had been collected from the research results and presented in tabular form which was then described in narrative form.

The tools and materials used in this study were urine pots (clean and dry), test tubes, centrifuges, dropper pipettes, glass objects, deg glass, microscopes and morning urine.

The research procedure carried out namely The urine collection pot is shaken so that the sediment mixes with the upper liquid. Then 7-8 ml of urine is inserted into the centrifuge tube. Centrifugation was performed at a speed of 1,500-2,000 rpm, for 5 minutes. Then the supernatant is removed so that the remaining sediment is about -0.5 ml approx. The tube is shaken to suspend the sediment, then 1 drop of urine is placed on a glass object closed with a glass. The next step is to examine it under a microscope with a 40x objective lens.

Assessment is carried out for abnormalities or deviations in the number of each element based on the reference value, namely white blood cells/leukocytes: normally found 0-5/lpb and red blood cells/erythrocytes: normally found 0-2/lpb [8]. The method of

examination, namely Native Preparations, is a direct examination with a light microscope. The principle of sediment examination is that the presence of organic and inorganic elements suspended in the urine will be precipitated by centrifuge and observed under a microscope.

## RESEARCH RESULT

**Table 1.** Characteristics of Respondents by age

No.	Age	Number of people)
1	31 - 40	4
2	41 - 50	4
3	51 - 60`	6
4	61 - 70	1
<b>amount</b>		15

**Source:** Primary Data, 2020

Table 1. shows that the respondents were dominated by the age group of 51–60 years, as many as 6 people, while in the range of 61-70 days, 1 respondent was obtained. and 61-70 as many as 1 person.

**Table 2.** Characteristics of respondents by gender

No.	Gender	Number of people)
1	Man	7
2	Women	8
<b>amount</b>		15

**Source:** Primary Data, 2020

Table 2. shows that the characteristics of respondents based on gender are dominated by 8 women and 7 men.

**Table 3.** Characteristics of Respondents based on catheter use

No.	Respondents	Number of people)
1	Which use	15
2	Who didn't use	0
<b>amount</b>		15

**Source:** Primary Data, 2020

Table 3. shows that the characteristics of the respondents based on the use of a catheter device in UTI patients, all respondents used a catheter.

**Table 4.** Urine Macroscopic Examination

No.	Respondent Code	Macroscopic Urine			
		Smell	Color	Volume (ml)	pH
1	Mr. N.	Typical	Yellow	80	7.8
2	Mrs.WH	Typical	Cloudy Yellow	40	6.5
3	Mrs. AR	Typical	Cloudy Yellow	50	7.0
4	Mrs.DK	Typical	Cloudy Yellow	30	7.6
5	Mr. AK	Typical	Cloudy yellow	70	7.8
6	Mr. BS	Typical	Reddish yellow	50	8.8
7	Mr. KM	Typical	Reddish yellow	20	7.0
8	Mrs. DL	Typical	Cloudy Yellow	35	7.6
9	Mr. HA	Typical	Reddish yellow	55	8.8
10	Mrs. W.B.	Typical	Cloudy Yellow	30	8.8
11	Mrs. KL	Typical	Cloudy Yellow	40	7.0
12	Mr. HI	Typical	Cloudy Yellow	80	7.6
13	Mrs. ST	Typical	Cloudy Yellow	40	7.8
14	Mr. PM	Typical	Cloudy Yellow	30	7.0
15	Mrs. HH	Typical	Reddish yellow. Cloudy	50	8.8

**Source:** Primary Data, 2020

Table 4. shows that based on the results of the study, 15 patients with Urinary Tract Infection (UTI) obtained the results of a macroscopic examination for a distinctive urine odor, urine color was yellow, cloudy yellow and reddish yellow, urine volume was between 20 and 80 ml, while urine pH was between 20 and 80 ml. 6.5 to 8.8.

## DISCUSSION

Urinary Tract Infection (UTI) is an inflammatory response of urothelial cells lining the urinary tract due to bacterial invasion and is characterized by bacteriuria and leukositoria, urinary tract infections can be seen from 2 factors, namely macroscopic and microscopic urine. Macroscopic urine is a type of

urinalysis that is performed to see the volume, color, clarity, and odor of urine. Microscopic urine is urine that is checked in the morning because the concentration is high, the results will be found in the form of organic elements (such as epithelial cells, leukocytes, erythrocytes, oval fat bodies, and microorganisms.

Research has been carried out by taking urine samples of patients with Urinary Tract Infection (UTI) in the inpatient room of the MPKP and Surgical Sp2kp at the Hospital. Prof. Dr. H. Aloei Saboe obtained as many as 15 inpatients who were then examined for urine sediment at the Hospital Laboratory. Prof. Dr. H. Aloei Saboe.

Characteristics of respondents based on age were dominated by 6 people in the 56-60 years age group, 4 people aged 30-40 and 45-54 years respectively and 1 person 61-70. This condition shows that age can affect.

With a total of 15 samples, it shows that most of the abnormalities seen from the image of erythrocyte sediment as many as 14 people.

The risk of developing tract infection along with the prevalence of UTI increases significantly from 5% -10% at age 50 years and to 20% at age 60 years and over. The characteristics of respondents based on gender in this study show that the incidence of urinary tract infections (UTIs) in women is higher than men due to several factors, namely the female urethra is shorter than men so that it is easier to be contaminated by bacteria that are makes it easier for contaminant bacteria to pass through the urinary tract, and the use of unclean public toilets can cause disease transmission through the genitals, especially bacteria and fungi.

Based on research that has been done using microscopic tests or urine sediment tests to see the number of erythrocytes and leukocytes in patients with Urinary Tract Infection (UTI) hospitalized in RSUD.

Prof. Dr. H. Aloei Saboe. The sample I use is the morning urine sample because morning urine is the first urine that is issued in the morning after waking up. This urine is more concentrated than urine excreted during the day, so it is good for sediment examination, in the microscopic examination of urine. Many erythrocytes are found, so the discharge comes from the lower urinary tract, this is because the erythrocyte travels from the site of infection to come out with the urine closer, causing the formation of blood clots that can block urine flow. The presence of erythrocytes in this study could be due to the respondent's factor, namely patients who have been diagnosed with Urinary Tract Infection (UTI) because people who experience Urinary Tract Infection (UTI) will usually experience hematuria due to inflammation or inflammation of the urogenital system causing bleeding or being found. erythrocytes and leukocytes in the urine sediment. This is in line with the theory [5], that erythrocytes in urine can come from any part of the urinary tract. Theoretically, there should be no erythrocytes. Hematuria is an increase in the number of erythrocytes in the urine due to: glomerular damage, tumors that erode the urinary tract, kidney trauma, urinary tract stones, infections, inflammation, kidney infarction, acute tubular necrosis, urinary tract infections.

The presence of erythrocytes in the urine sediment indicates hematuria, usually occurs in patients with cystitis or urethritis, if there are erythrocytes in the urine of more than 2 visual fields this indicates bleeding in the urogenital system or there is infection/inflammation, therefore if a patient with Urinary Tract Infection (UTI) experiences bleeding in the urogenital system will result in fever, nausea and vomiting, pain over the genitals or bladder area, smelly urine, frequent urination, and pain when urinating and pain when urinating [15].

The presence of leukocytes in the urine sediment indicates the presence of micro-organisms in the body, especially in patients who have urinary tract infections, kidney infections or even tumors. According to Gandasoebrate. shows that the leukocyte count increases as a manifestation of inflammation in the patient's urinary tract. Leukocytes in urine > 5/lpb usually occur together with urinary tract infections [8].

## CONCLUSION

Based on this research, it can be concluded that:

1. Based on the macroscopic examination, the urine results were abnormal, there was urine Ph of the 15 patients which was wet and the urine color indicated that the patient was having a urinary tract infection.
2. Based on the study of the image of the urine sediment in patients with urinary tract infections by microscopic examination, it can be concluded that in patients with urinary tract infections (UTIs), erythrocytes are dominated by more than 0-2/lpb (93%) and leukocytes more than 0-5/lpb (80%) or abnormal.

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